REMARKS

Restriction Requirement—35 U.S.C. § 121

The Examiner has required restriction to an invention set forth in claims 1-7 or to claims 8-16. Applicant's counsel confirms that the Examiner advised her of this requirement in a telephone call on or about September 9, 2003. Applicant's counsel further confirms that she elected for initial examination claims 1-7. Applicant does not traverse this restriction requirement.

Claim Rejections—35 U.S.C. § 112

The Examiner has rejected claims 1 and 3 under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Specifically, the Examiner has stated that in claim 1, "the chelate" and in claim 3 "the iron" lack clear antecedent basis. Accordingly, claim 1 has been amended to substitute "the chelating agent" for "the chelate" and thereby to provide a term for which there is antecedent basis. Claim 3 has also been amended to substitute the term "sulphide ion" for "iron" and to substitute the phrase "react with" for the term "chelate" to correct errors in the typing of the claim and to provide clarification, thereby making the Examiner's rejection unnecessary.

Claim Rejections—35 U.S.C. § 103

The Examiner has rejected claims 1-7 under 25 U.S.C. § 103(a) as being unpatentable over Son et al 4,526,693 ("the Son'693 reference" or "Son '693"). The Applicant respectfully traverses the Examiner's rejections. One would not have the benefit of Applicant's invention without Applicant's teachings and Applicant's teachings are not suggested by or obvious from the Son '693 reference for the reasons discussed below.

In support of his rejections, the Examiner has specifically cited column 2, line 18 through column 3, line 24 of the Son '693 reference. However, the drilling fluid described in the Son '693 reference is actually quite different from the fluid of Applicant's invention. Applicant teaches on page 1 at lines 22-30 that good shear thinning rheology, an important property for drilling fluids, is generally achieved in one of two ways. Those ways are: (1) by using a

dispersion of colloidal clay minerals such as smectite clays, e.g., bentonite (as used in Son '693); and (2) by using polymers such as xanthan gum or scleroglucan that can be dispersed in aqueous solutions (as used in Applicant's invention).

That is, Son '693 uses a clay based dispersed system whereas Applicant uses a non-dispersed system based on polymers. Applicant has amended claim 4 to emphasize this distinction. Son '693 uses an ammonium salt; Applicant does not. *See* Son '693 at column 2, lines 18-20, lines 27-30, and lines 44-50. Son '693 specifically teaches at column 3, lines 13-15 that the pH of the drilling fluid is adjusted to provide a pH in the range of from about 5.0 to 9.0 and, preferably from about 7.0 to 9.0. The pH adjustment is said to preferably be accomplished by addition of an alkaline agent such as sodium hydroxide. A pH in excess of 9.5 is said to free ammonia gas which is undesirable. Son '693 at column 3, lines 16-25. In distinct contrast, the advantages of Applicant's invention are realized at pH greater than 9.0—the very pH that renders the fluid of the Son '693 reference subject to emission of ammonia gas.

Mention of use of ferrous gluconate in the drilling fluid in the Son '693 reference is in the context of providing a pH and rheology-control agent, but ferrous gluconate is not required for the Son '693 fluid. Son '693 at column 2, line 67- column 3, line 3. Ferrous gluconate in the Son '693 fluid is said to buffer the pH of the fluid against rapid pH change over a wide pH range and to stabilize the fluid by reducing the possibility of free ammonia generation as a result of pH excursions. Son '693 at column 3, lines 3-10. Ferrous gluconate is said to effectively neutralize any increased potential for corrosion which results from the slightly acid pH range of the fluid. Son '693 at column 3, lines 17-20. Son '693 teaches addition of a corrosion agent such as a quaternary amine salt to provide "additional corrosion protection." Son '693 at column 3, lines 26-29.

The fluid of the Son '693 reference is to provide a clay-based aqueous or emulsion drilling fluid containing dissolved inorganic salts for use in shale and salt formations. The Son' 693 patent teaches a method to avoid flocculation of the clays being used for viscosity control. Son '693 at column 1, lines 58-65.

In contrast, Applicant's fluid is for use in a subterranean zone in which hydrogen sulphide is expected to be encountered. Applicant's fluid is not slightly acidic or slightly basic like the fluid in Son '693, but rather is formulated to have a very high pH (preferably at least 11.5) in order to suppress the evolution of hydrogen sulphide gas.

The significance of pH in Applicant's invention should not be discounted. Applicant teaches at page 3, lines 9-14 of his specification that iron has been known in the prior art to form insoluble sulphide upon reaction with hydrogen sulphide. However, Applicant explains that iron has been found in the prior art to be generally unsuitable as a sulphide scavenger because the iron compounds have not been stable in solutions at high pH—both iron (II) and iron (III) precipitate as gelatinous iron hydroxide, which would have unacceptable effects on the rheology of the drilling fluid. Applicant noted in his specification at page 3, line 22- page 4, line 9, the teaching of an iron chelate as a downhole hydrogen sulphide scavenger in drilling mud by Jeffrey et al. (US Patent No. 4,756,836), particularly in water based clay muds (the type mud used in the Son '563 reference). However, the iron chelates of Jeffrey et al have limited stability at high pH. Iron in those chelates is well known to tend to precipitate out as ferric hydroxide at a pH greater than 9, and most at a pH below 9.

Thus, an inorganic chemistry textbook might typically list metals that will precipitate sulphide and thus that could potentially be used as sulphide scavengers. How to actually use the metals as scavengers in a practical application, as in drilling fluids without adversely affecting the rheology of the drilling fluid, is the point of invention. Reviewing the chemistry of iron, one skilled in the art knows that iron in solution can be precipitated by several anions, including hydroxide and sulphide. If iron is to be used as a sulphide scavenger in a drilling mud, then the iron must be precipitated as sulphide not as hydroxide. Iron precipitated as a hydroxide is a gelatinous material which would interfere with the viscous properties of the drilling fluid in an undesirable way. Iron salts, such as ferrous chloride, are soluble in water, but that solubility is a function of pH. For example, at pH 5-6, ferrous iron will remain in solution, but at pH above that range the iron will be precipitated as the hydroxide. In order to stabilize iron in solution at higher pH, it is necessary to complex the iron ions with suitable complexing agents. However, the stability of the various complexes that can be used depends upon pH. The higher the pH, the more likely it is that the iron will be precipitated as iron hydroxide. Moreover, the fact that an iron complex is stable up to pH 9 does not make it obvious that it will be stable up to pH 11, pH 12 or higher. To demonstrate such a leap in reasoning, one could consider saying that because iron chloride is stable in solution at pH 6, it can be used as a sulphide scavenger at pH 12, when in fact it cannot. There are many iron complexes which are stable at pH 9 which would not be stable or satisfactory at pH 12.

Applicant respectfully submits that the Examiner's statements on page 3 of the office action, that, "*It would have been obvious to one skilled in the art to modify the method of Son et al. by forming or precipitating iron sulfide in the fluid, to aid in reducing corrosion in a drilling fluid wellbore*", and that, "*The specific pH utilized and quantity of gluconate added, would have been an obvious matter of process optimization to one skilled in the art, depending on the specific fluid treated and results desired, absent a sufficient showing of unexpected results*" reflect application of the regularly rejected **obvious-to-try** standard. See *Ex parte* Erlich, 3 U.S.P.Q.2d 1011 (B.P.A.I. 1986). The Federal Circuit has repeatedly held that obvious-to-try or obvious-to-experiment is **not the standard for obviousness** under 35 U.S.C. §103. *In re* Geiger, 815 F.2d 686, 2 U.S.P.Q.2d 1276 (Fed. Cir. 1987). **According to the Federal Circuit, an "obvious-to-try" situation exists when a general disclosure may pique the scientist's curiosity, such that further investigation might be done as a result of the disclosure, but the disclosure itself does not contain a sufficient teaching of how to obtain the desired result or indicate that the claimed result would be obtained if certain directions were pursued.** *In re* Lilly & Co., 902 F.2d 943, 14 U.S.P.Q.2d 1741, 1743 (Fed. Cir. 1990).

The Federal Circuit has dictated that the prior art must provide a motivation or reason for the worker in the art, without the benefit of the applicant's specification, to make the necessary changes to reach applicant's invention. *In re Jones,* 958 F.2d 347, 21 U.S.P.Q.2d 1941, 1944 (Fed. Cir. 1992); *In re Deminski,* 296 F.2d 436, 230 U.S.P.Q. 313 (Fed. Cir. 1986); *accord, Ex parte Kranz,* 19 U.S.P.Q.2d 1216, 1218 (B.P.A.I. 1990).

A basic issue is whether the applied reference suggests the claimed invention as a solution to the specific problem solved by Applicant's invention. *Lindemann Maschinenfabrik GmbH v. American Hoist and Derrick Co.,* 730 F.2d 1452, 221 U.S.P.Q. 481 (Fed. Cir. 1984). Focusing on the obviousness of substitutions and differences, as Applicant respectfully submits the Examiner has done here, instead of on the invention as a whole, is a legally improper way to simplify the difficult determination of obviousness. *Hybritech Inc. v. Monoclonal Antibodies, Inc.,* 802 F.2d 1367, 231 U.S.P.Q. 81, 93 (Fed. Cir. 1976). There is no basis for concluding that an invention would have been obvious solely because it is a combination of elements that were known in the art at the time of the invention. *Smiths Industries Medical Systems Inc. v. Vital Signs Inc.,* 183 F.3d 1347, 51 U.S.P.Q.2d 1415, 1420 (Fed. Cir. 1999).

The Examiner must show reasons that the skilled artisan, confronted with the same problems as the inventor and with no knowledge of the claimed invention, would select the elements from the cited prior art reference for combination in the manner claimed. *See In re Rouffet*, 149 F.3d 1350, 47 U.S.P.Q.2d 1453, 1458 (Fed. Cir. 1998). The motivation to make a specific structure is not abstract, but practical, and is always related to the properties or uses one skilled in the art would expect the structure to have, if made. The critical inquiry is whether there is something in the prior art as a whole to suggest the desirability, and thus the obviousness, of making the combination. *In re Newell*, 891 F.2d 899, 13 U.S.P.Q.2d 1248, 1250 (Fed. Cir. 1989). Both the suggestion and the expectation of success must be founded in the prior art, not in Applicant's disclosure. *In re Dow Chemical Co.*, 837 F.2d 469, 5 U.S.P.Q.2d 1529 (Fed. Cir., 1988). **It is the invention as a whole that must be considered in obviousness determinations.** The invention as a whole embraces the structure, its properties, and the problem it solves.

> It is error to focus solely on the product created, rather than on the obviousness or non-obviousness of its creation. Thus, the question is whether what the inventor did would have been obvious to one of ordinary skill in the art attempting to solve the problem upon which the inventor was working. The problem solved by the invention is always relevant. **The entirety of a claimed invention, including the combination viewed as a whole, the elements thereof, and the properties and purpose of the invention, must be considered.** Factors, including unexpected results, new features, solution of a different problem, and novel properties, are all considerations in the determination of obviousness in terms of 35 U.S.C. § 103. . . . The requisite view of the whole invention mandates consideration of not only its structure but also its properties and the problem solved. Notwithstanding the fact that only old elements are used, the patentability of a new combination of old elements, that produces a result that is not suggested in the references, is of ancient authority. Virtually all inventions are combinations, and every invention is formed of old elements.

In re Wright, 848 F.2d 1216, 6 U.S.P.Q.2d 1959, 1961 (Fed. Cir. 1998)(emphasis added).

Applicant respectfully submits that the Examiner's conclusion that the Son '693 reference renders Applicant's invention obvious is erroneous. Son '693 is directed to a different problem than Applicant's invention and is directed to a different solution. The Son '693

reference never suggests use of ferrous gluconate as a solution to the problem of Applicant's invention—the problem of precipitating or removing hydrogen sulphide from a polymer based drilling fluid at a high pH, at a pH greater than 9. The Son '693 reference never suggests use of the fluid taught therein at pH higher than 9.0 and specifically teaches away from use of the fluid at higher pH levels. The Son '693 reference never suggests use of ferrous gluconate to remove hydrogen sulphide from a drilling fluid used in drilling a formation yielding such copious amounts of hydrogen sulphide that the drilling fluid has to have a high pH to put the hydrogen sulphide in the drilling fluid so as to avoid emission of the hydrogen sulphide as a gas from the formation during the drilling. The Son '693 reference never suggests use of ferrous gluconate in polymer based drilling fluid at any pH.

Applicant respectfully requests the Examiner reconsider his position and Applicants amended claims. Applicant also requests the Examiner consider the new claims added to further claim the invention. Support for the new claims may be found in the claims as originally filed, as well as in the specification.

Applicant respectfully submits that the claims as amended are now in condition for allowance and Applicant respectfully requests the Examiner to allow the application to proceed to issue.

Respectfully submitted,

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